Cadence Virtuoso Setup Guide

A step-by-step guide for ECE 331 students to setup Cadence Virtuoso for digital gate design.

Cadence runs from a server on a UNIX/Linux platform but can be accessed from a PC using software that logs you into a UNIX server and routes monitor data to the PC. All the software you need is installed in the DECS PC labs. This guide will demonstrate how to setup Cadence Virtuoso from a DECS PC (or other authenticated PC in the Engineering Building). It is possible, albeit quite slow, to run Virtuoso from off campus. At the end of this guide are some notes to assist if you wish to try. However, off campus use of Cadence Virtuoso will not be supported by the instructor or TAs; if you try you are on your own.

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## Setting up Cadence Virtuoso (from an Engineering PC)

1. **Starting Xming & PuTTY**
   PuTTY is an SSH (secure shell) client that allows a PC to connect to a UNIX/Linux server and issue commands remotely. **Xming** is a Windows program that tunnels UNIX graphics from the server to a PC using something called *X11 forwarding*. Both programs are installed on all DECS PCs. To run Cadence *Virtuoso* from a PC, it is essential that you run both **Xming** and **PuTTY**.

   1. Start **Xming** (Start Menu -> All Programs -> Xming (folder) -> Xming (executable))

      Note: You must start **Xming** before starting **PuTTY**. **Xming** will run in the background and you will not see any change after starting the program except for a new icon in the taskbar.

   2. Start **PuTTY** (Start Menu -> All Programs -> Putty (folder) -> Putty (executable)) and then configure it as follows:

   3. To enable X11 forwarding, expand the *SSH* option under *Connection* within the Categories on the left side of the configuration window. Select *X11* and then check the box to *Enable X11 forwarding*. See images below.

   4. Select the *Session* Category and enter a host name. There are several servers (hosts) available, but for now just use *deus.egr.msu.edu* for the host name. The image below shows the host *scully*, which is used for off network logins, but you cannot run Cadence from *scully* so use *deus* for now.

   5. To save these setting to use again later, from the *Session* Category, enter a session name (e.g. ece331) in the Saved Sessions dialog box, and click *Save*. You can **Load** this session next time you start **PuTTY** rather than entering all of the configuration parameters.

   6. Finally, click *Open* to start the PuTTY session. The first time you log into any server, **PuTTY** will ask you to verify the authenticity of the server. Just click *Yes*.

   7. In the PuTTY window that opens, login using your EGR username and password. You should now be at a SSH command prompt as shown below.
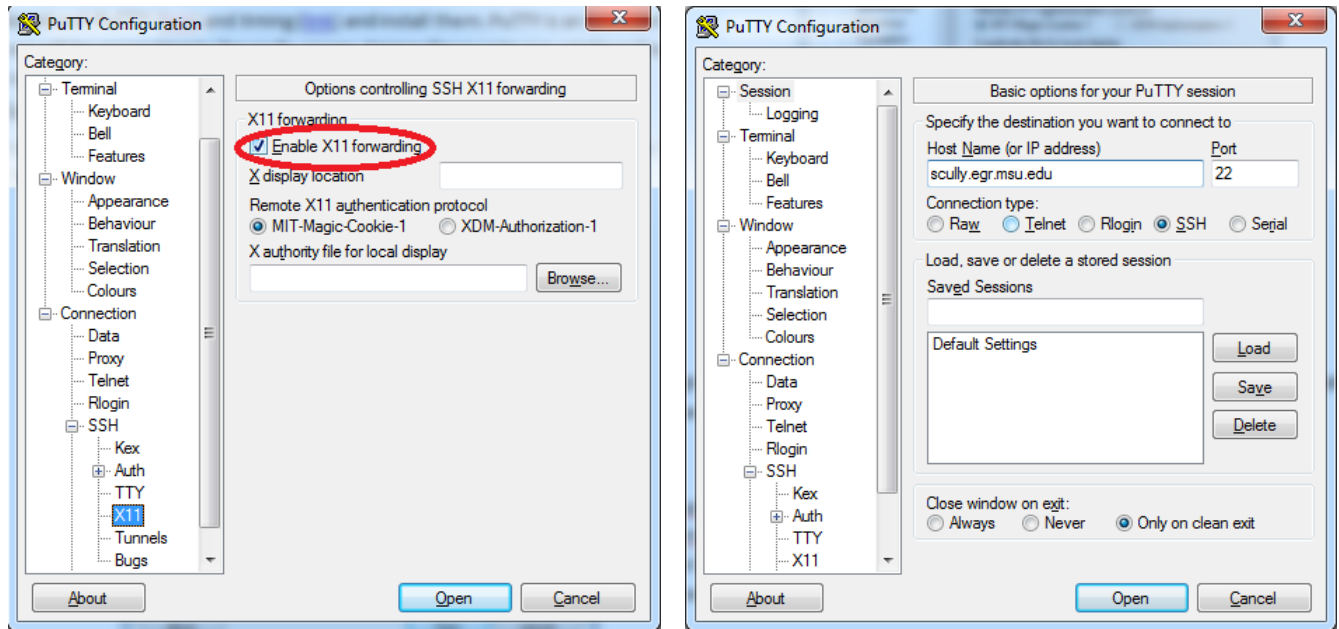
PuTTY Configuration Windows
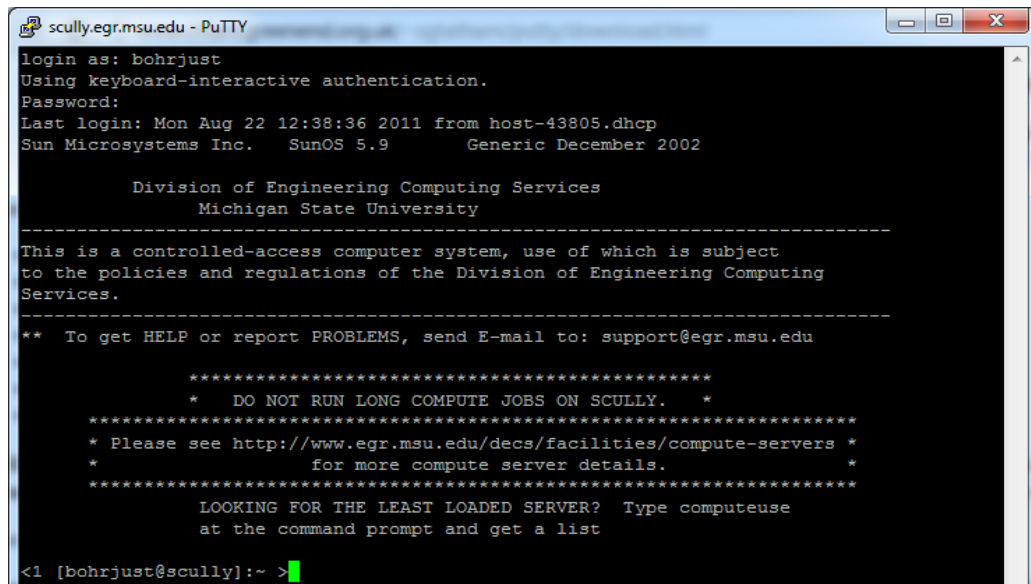
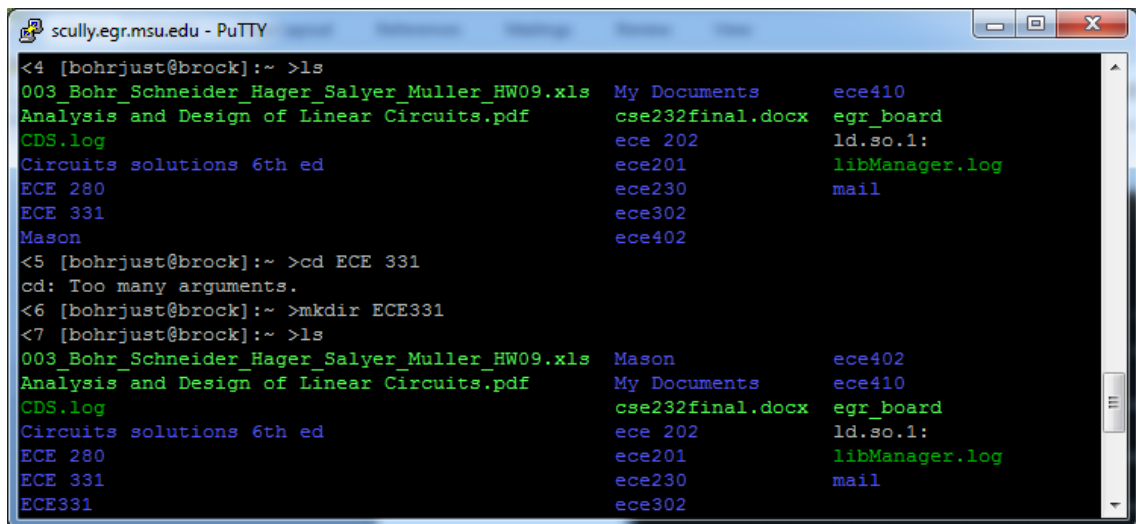*PuTTY SSH Window*

2. Making a Directory: Navigating in UNIX

Before running Virtuoso, you should make a directory to store all of the files created by *Virtuoso*. To do this, you need to use a few UNIX commands. Some basic UNIX commands are described in Appendix A. Additional information can be found on the DECS UNIX Tutorial.

1. To see a list of the files in your current directory, at the command prompt in the PuTTY window, type the command **ls**.

2. Make a new directory named ECE331 using the command **mkdir ECE331**.

   UNIX <u>directory names should not have spaces</u> or you won't be able to access them with PuTTY.

3. Move into the new directory using the command **cd ECE331**.

4. Use the command **mkdir virtuoso** to make a new directory under ECE331 where you will store all *Virtuoso* files.

5. Move into the new directory using the command **cd virtuoso**.

You **must move into the _ECE331/virtuoso_ directory every time before you start Virtuoso** so that _Virtuoso_ will save files in the right place. From the root directory, you could do this in one step by typing

cd ECE331/virtuoso

Note that **cd ..** (space and two periods) will move you up to the parent directory and **cd** with no arguments will return you to your root/home directory. Note also that Shift+up/down arrow (or Pg Up/Dn) will scroll through past commands.

PuTTY Window after creating specified directories.
Notice that a directory name with a space (ECE 331) creates an error.
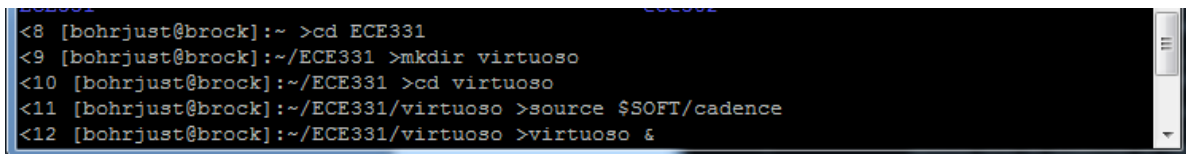
3. **Setup and Run Virtuoso**

Before you run _Virtuoso_ for the first time, you need to run a script that will download files and setup your login for using Cadence tools. **You only need to run this specific script once** (unless something gets updated) and **you must be in the proper directory before running this script.**

1. Make sure you are in your ECE331/virtuoso directory and then enter the command
   source $SOFT/cadence-auto

   Note that once you log out, the next time you want to start a Virtuoso session, you will need to enter the script command **source $SOFT/cadence** (without the -auto), and you must enter this every time before launching Cadence. If you fail to run this script, you will see a "command not found" error when you try to launch Virtuoso. If you know how, you can enter the script command into your login script so it will run automatically (not covered in this guide).

2. To start _Virtuoso_ (while in ECE331/virtuoso), enter the command **virtuoso &**

   The & at the end of the command will allow you to keep using your **PuTTY** window for other commands. You should now see two new windows open on your desktop, a Virtuoso command window and a Library Manager window, as shown below.

PuTTY Window after launching Virtuoso

3. Once the Virtuoso windows open, print (or safe to file) a screen shot of your monitor showing both the PuTTY window and the _Virtuoso_ windows. You will turn this in with your pre-lab as proof you have complete these setup steps.
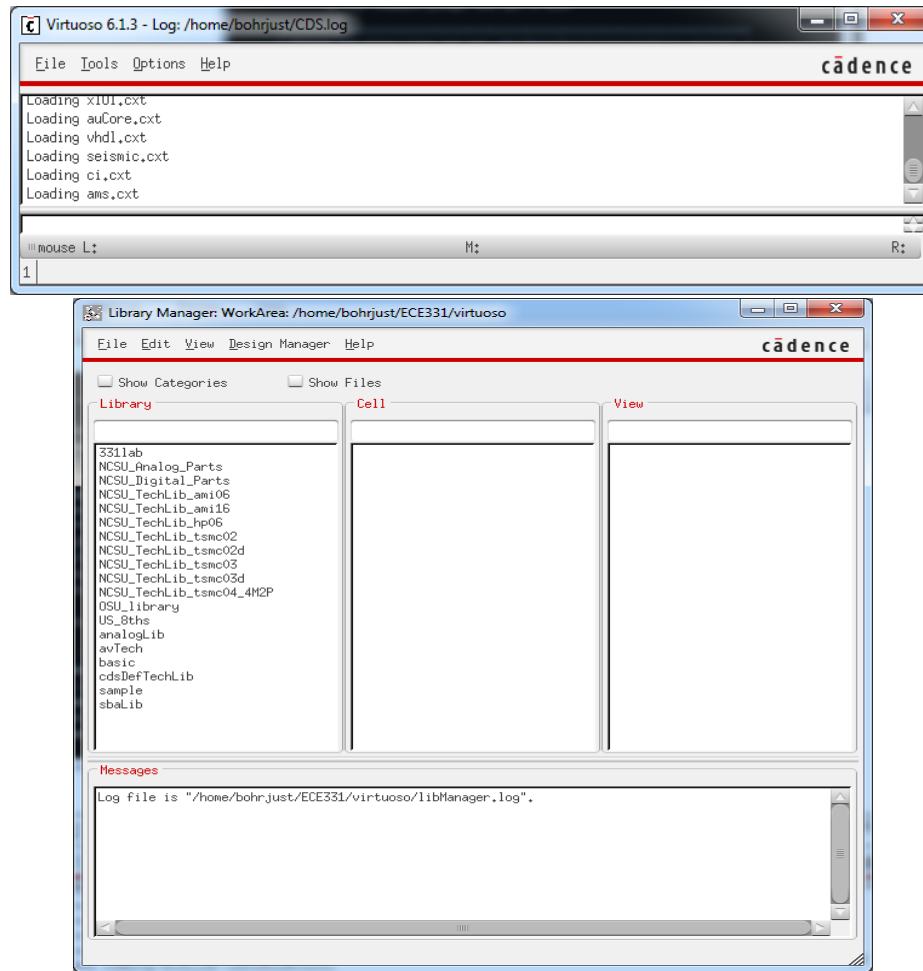
Main Virtuoso windows after launching Virtuoso

4. Exiting and Server/Host Selection

For this Setup Guide, all you need to do is successfully launch Virtuoso. More information on the use of Virtuoso is in another guide.

1. To quit *Virtuoso*, from the Virtuoso window select File -> Exit.

2. Before exiting PuTTY, let's explore the choice of servers available. In the PuTTY command prompt, type "**computeuse**" and hit ENTER to see a list of Linux servers and their current load. DECS has several Linux/UNIX servers and it generally best to try to login to one that is not being used as heavily. The list generated (see image below) also shows you all the servers you can log into initially from PuTTY (rather than deus.egr.msu.edu, as suggested in step 1.4). In the future, you can directly log in to any of these servers.

3. Once logged into a server, you can always connect to another server using *ssh*. Choose a server from the "computeuse" list with a low load and connect to it by entering the command **ssh <*servername*> –Y**

   Do not forget the –Y; it is necessary for X11 forwarding. You may be asked to enter your password again. You may also be asked to verify the authenticity of the new host; if so type "yes" and hit ENTER.

   From the new server, you could navigate to your virtuoso directory and run Virtuoso. You can test it now if you would like.

4. To log out of the servers, in the PuTTY window type **exit** ENTER and you will be logged off the server. If you used ssh to login to a second server, type **exit** ENTER again to log off the initial server (deus in this case). This should stop and close PuTTY.

```
scully.egr.msu.edu - PuTTY

<1 [bohrjust@scully]:~ >computeuse
HOSTNAME                ARCH          NCPU  LOAD  MEMTOT  MEMUSE  SWAPTO  SWAPUS
-------------------------------------------------------------------------------
brock                   1x24-amd64      8  0.00   61.7G  812.2M    9.3G     0.0
byron                   1x24-amd64      8  1.03   61.7G    6.8G    7.5G     1.1M
deus                    1x24-amd64      8  0.15   61.7G    5.7G   18.6G    60.0M
helper                  1x24-amd64      8  1.00   61.7G    1.3G    9.3G     0.0
monarch                 1x24-amd64      8  1.00   61.7G    1.5G    9.3G     3.2M
pinako                  1x24-amd64      8  0.00   61.7G    1.3G   18.6G     4.5M
rusty                   1x24-amd64      8     -   61.7G       -   18.6G       -
sati                    1x24-amd64      8  0.00   61.7G  746.7M    9.3G     3.1M
triana                  1x24-amd64      8     -   59.0G       -   18.6G       -
winry                   1x24-amd64      8  0.00   61.7G  979.7M   18.6G     2.8M
<2 [bohrjust@scully]:~ >ssh brock -X
Password:
Last login: Mon Aug 22 11:58:46 EDT 2011 from scully.egr.msu.edu on pts/1
    Gentoo Linux                                           x86_64 INTEL

              Division of Engineering Computing Services
                    Michigan State University


*******************************************************************************
-------------------------------------------------------------------------------
This is a controlled-access computer system, use of which is subject
to the policies and regulations of the Division of Engineering Computing
Services.
```

PuTTY window showing "computeuse" and "ssh" commands. Note, with X11 forwarding you should not use the –X argument on ssh commands (as shown); instead use –Y.

Appendix A: UNIX Commands Useful for Running Cadence Virtuoso

Some basic UNIX commands are described below. Additional information can be found on the DECS UNIX Tutorial.

    ls   lists files in current directory

    mkdir <dirname>   make new directory named <dirname>

    cd <dirname>   change directory to <dirname>

ls - lists all the files that are in the current directory.

cd *path* – cd stands for change directory, type cd then the path of the directory you want to go to.
cd .. – move up one directory
cd - return to the root directory

mkdir *name* – mkdir stands for make directory, type mkdir then the name you want that directory to have. This directory will be created within the current directory you are in.

rm (**-f**) *name* – stands for remove, the optional –f would be used if you wanted to remove a file.

source $SOFT/cadence(**-auto**) – this command tells the server you are on that the directory you are in is where you want to run Virtuoso from. If the files are not there to run Virtuoso then they will be copied there. The –auto option is a script that will install the extra elements that DECS has added, mostly libraries and only needs to be run once. The command without the –auto option needs to be run each time you start a new session.

virtuoso & - after running the source $SOFT/cadence command, you can run this command that will launch virtuoso. The ampersand (&) lets you continue to use the terminal window for commands you started virtuoso in.

Note: the path for the model libraries is
Mnt/soft/….

computeuse – use this command to see the names of the running servers and the current load on each server.

scully is the main EGR server that lets you observe the other servers and access your files, but you cannot run virtuoso on this server. You can either connect to *scully* and choose which server to connect to from there, or you can skip connecting to *scully* and directly connect to any of the servers by entering *servername*.egr.msu.edu into PuTTY instead of scully.egr.msu.edu.

ssh *servername* **-Y** – allows you to connect to a server while in terminal (i.e., on a PC).

Appendix B: Running Cadence from Outside the Engineering Network

Engineering account can be used to remotely log in to DECS UNIX/Linux servers, and with the right interface software it is possible to run Cadence *Virtuoso* from off campus. However, be warned that is very slow so you are highly encouraged to use this software from a PC in the Engineering building. You can also get the interface software from the internet and run from your own PC using your engineering account. Please note that off campus use of Cadence tools will not be supported beyond the information within this guide. If you do find new/better ways for remote use, please discuss with the instructor and we will try to integrate your information into this guide.

1. **PuTTY and Xming**

   PuTTY and **Xming** must be installed on any PC to run Cadence Virtuoso. Follow these instructions to download and install **PuTTY** and **Xming**.

   PuTTY can be downloaded from here (link). If you are running any version of Windows, select the putty.exe file. Some additional information can be found on this [DECS help page](link). When you run **PuTTY** for the first time, you must set a server to connect with. Use *scully.egr.msu.edu*.

   Xming can be downloaded here (link). Information on installing and using Xming can be found on this [DECS help page](link).

2. **Starting Xming & PuTTY**

   Follow the instruction above. However, from outside the DECS network, you must first connect to the sever named *scully* as a login gateway..

   5. Start Xming

   6. Start PuTTY and then configure it open a session on *scully.egr.msu.edu*. Be sure to also setup X11 forwarding.

   7. Although you must log in through *scully*, you cannot run Cadence applications on that server. You must connect to a normal server (see list above) by entering the command
      ssh <*servername*> –Y

   From this point, everything else should be the same. Note, to exit your session you will need to enter "exit" twice at the PuTTY command prompt, once to exit your *ssh* session and once to exit your initial connection to *scully*.